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VISION: MSC- A PREMIER COLLEGE IN THE REGION ALONG THE FIELDS OF INSTRUCTION, RESEARCH, EXTENSION AND PRODUCTION
MISSION: PROVIDE QUALITY, RESPONSIVE AND DYNAMIC LEADERSHIP IN THE AREAS OF EDUCATION, TECHNOLOGY, ENGINEERING, ENVIRONMENT, AGRICULTURE, FISHERIES, CULTURE, ARTS AND SCIENCES TO EMPOWER GOD-FEARING INDIVIDUALS WHO ARE INNOVATORS AND PROTECTORS FOR THE SUSTAINABLE DEVELOPMENT OF THE PROVINCE AND THE COUNTRY AS A WHOLE.

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FOREWORD

This thin volume of the Marinduque State College School of Arts and Sciences Research and Extension Journal compiles the initial output of its faculty members. In the context of multifaceted challenges that confront the province, the encroachment of globalization and impacts of climate change. Both have been subject of a lot of debates and discussion among academics and other concerned institutions. This is the effort of the MSC School of Arts and Sciences to bring this closer to its public, the communities outside the academe. This meager accomplishment would guide the future research and extension agenda of the school. With a distinct characteristic of being interdisciplinary, combining communication research, language studies, social research, mathematics education and art studies. It is already given that Research and Extension (R & E) are closely intertwined functions inherent among faculty members of higher learning institutions. Due to the changing phase of globalization and climate change, the academic programs in any institution should be able to respond. Marinduque State College is no exception, the appropriate guidelines should be in place and become a light post. Therefore, this document which was the result of concerted consultations and validation process provides the scope of R & E thrusts and direction for the next five years, 2012 to 2016, of the School of Arts and Sciences (SAS) which currently offers the degree of Bachelor of Arts major in English and Communication Arts.

Julieta L. Go, PhD.
SAS Dean

SAS Research and Extension Thrusts 2012-2016

Communication Research and Extension

Research activities would dwell on understanding the communication process of technology transfer and extension education to the farming communities and target audience of advertisements as well as developing a series of advertisements in given target consumer markets including evolution of ICT educational delivery system for adult and out-of-school youth.

Analyses of how research on changing agricultural conditions and the environment are communicated between researchers and extension officers, and between extension officers and farmers. Additionally, an identification and description of other types of driving forces and barriers to strengthen the competitiveness of agricultural entrepreneurs and farmers in their adaptation to climate change.

Researches covering the improvement of the efficacy of local advertising which may focus on a specific advertisement or campaign, or may be directed at a more general understanding of how advertising works or how consumers use the information in advertising especially on those relating to farm products and inputs, personal care products to enable users to choose safe products, environment and community announcements. Communicating results of researches about food safety and chemical residues, environmental disaster and mitigation would likewise be covered in the next few years. It can entail a variety of research approaches, including psychological, sociological, economic, and other perspectives.

Language Research and Extension

Language acquisition research aims to describe and explain children's syntactic development within a functional and usage-based approach. This includes documenting how children's knowledge of grammar develops and changes between the ages of 2-3 years to establish how children's language might gradually become more adult-like.

Language processing research investigates the time course of sentence interpretation using a variety of experimental methodologies, including reading time measures, eye-tracking, syntactic priming techniques and discourse. The broad aim of this research is to investigate the architecture of the language performance system.

Research undertaking in this area is also geared towards understanding the problems of students in the acquisition of oral and written facilities especially in English usage. It may be helpful that coverage of any study on this would cover starting from the first step of the formal educational system of the country. Information to be evolved from any research initiatives on this should be able to lead the faculty in improving generally the present facilities of at least students from the major fields of specialization of the academic offerings of the school.

Social Research and Extension

Social research in the school would dwell on local social issues and concerns that would help local legislators and decision-makers understand local economy and organization and how they affect society and local governance. Planning is a primordial prerequisite of any development plans and the insufficiency of needed data and the absence of database greatly affects any planning exercise and the consequent developments and outputs of projects and programs for the development of the province. Such would be given emphasis by researchers aside from researches covering local history and indigenous knowledge, economics of education, agricultural economics and farming systems, and local development, entrepreneurship, population and commodity trends.

Mathematics Education Research and Extension

Mathematics is one subject where students usually meet problems in understanding the lessons. SAS research in mathematics education has primarily two purposes: first to better understand the nature of mathematical thinking, teaching, and learning; and second to use such knowledge in practice for learning and teaching mathematics. As such, studies along methodological Issues in mathematics education research are highly encouraged.

Arts Studies and Extension

Research in this discipline is concerned with the artistic culture of local society in the province as a whole, as well as the various types of arts and their specific characters, relationships to reality, origins, laws of development, roles in the history of social consciousness, and interdependences with social life and with other cultural phenomena. The entire complex of problems concerning the content and form of works of art is also examined. The discipline embraces the study of literature (more frequently classified among the philological sciences), music, the theater, and the cinema as well as the development of indigenous arts.

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GUIDED LEARNING APPROACH TO IMPROVING ENGLISH COMMUNICATION SKILLS AND SELF-CONFIDENCE DEVELOPMENT

One of the weaknesses of college graduates today is lack of good communication skills in English. Higher education institutions' main concern is to produce globally competitive graduates; possessing marketable technical know-how as well as being conversant in the language of their profession. It is imperative for educational institutions to look for effective teaching approaches and strategies to develop good English communication skills and self-confidence of students to prepare them for employment, thus, this study.

The goal of this study was to develop an approach and/or strategy that would improve the English communication skills of college students in listening, speaking, reading, and writing and develop self -confidence in expressing themselves in English. Its objective is to determine the effectiveness of the "Guided Learning Approach" (GLA) to improving the student's English communication skills in listening, speaking, reading and writing with emphasis on grammar, spelling, sentence structure and word usage and the development of the student's self-confidence.

The Guided Learning Approach in this study was patterned after the Supervised Study Lesson by Lardizabal (1977). The Guided Learning Approach includes revisions of the supervised study lesson approach integrating student self- and peer evaluation of classroom performance. GLA consists of step by step presentation of topics during class discussion. The steps would develop the learn-to-learn skills of the students at the same time correct pronunciation, proper phrasing and pausing, correct grammar and sentence structure. English skills may be learned through frequent exposure to the language to provide opportunities for practice and use in actual learning environment.

To hasten the process or acquisition of these skills, the learners should be trained in "learn-to learn skills" and be encouraged to do self-evaluation and correction of errors committed. It is also hypothesized that self-confidence is developed when the student can express himself even in simple, grammatically correct sentences that are clear in meaning.

This study was a quasi-experiment employing pretest-post test control group design conducted at the Marinduque State College, Boac, Marinduque in the first semester SY 2010-2011. The subjects of the study were first year AB English, AB Communication and BS Law Enforcement Administration students taking up English II. Teacher made tests were used to measure written skills and reading skills consisting of 100 multiple choice items in grammar, sentence structure, spelling and word usage. Score card was used in measuring speaking skills while rating scale was used in measuring listening skills. Student t-test was used to determine significant difference in the four macro skills in English at 0.05 level of significance.

The result shows that the experimental group exposed to GLA showed a higher performance than the control group exposed to the lecture-discussion especially in writing skills. Exposed to GLA, the students developed better self-confidence and actively participated in class discussion. The researchers recommended the use of the GLA not only in teaching English but also in other subjects specially mathematics and sciences.

A language teacher must be patient in teaching and has to strategize so that shy and passive students will be motivated to learn the language.

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arly Childhood Learning Centers (ECLC) in the Rural ommunities of Marinduque: Basis for Curriculum

Abstract—Determining the status of the Early Childhood Learning Centers (ECLC) in Marinduque and the needs of ECLC mentors are he aims of the study. Baseline information on Early Childhood Education (ECE) can be the bases for the development of respon-ive programs and projects to improve the delivery and quality of CE to the young learners of the province.

Survey questionnaire and interview guides were used in he study. The respondents were the Day Care Workers referred to s the ECLC mentors. Records from the Municipal Social Welfare nd Development (MSWD) Office and interview of the Municipal ocial Welfare and Development (MSWD) Officers together with the nformation from the questionnaire were the primary source of the ata. Actual observations in the field were also done.

Results of the study revealed that out of 218 barangays f the province 209 ECLCs were established. All the mentors are emale and majority are high school graduates. The problems of he mentors include the low honorarium they receive, lack of sup-ort from parents, lack of educational materials, need for the im-rovement of the physical facilities and the lack of support from he Barangay Councils.

As a consequence of the problems met by the mentors, hey expressed their needs for assistance, especially in providing he centers with more educational materials for the children's ac-ivities/ seminars for them to give quality services to the children, ssistance to improve their physical facilities and the support from arents and the barangay councils.

Keywords: *day care workers, early childhood learning, early childhood learning centers, Marinduque, rural communities.*

ntroduction

Kids are a long-term investment (Miles, 1996). This may e the reason why many Filipinos consider education for their chil-ren as a top priority concern. However, many do not see the im-ortance of starting to educate the young kid even at an early tage or the parents may not just have the means to support their hildren for an early education. The latter, would especially refer to arly education in private learning centers where costs could be as ostly as or even higher than the costs of college education. Early hildhood Education (ECE) is the term applied to the education of oung children from birth through age 8 (Bredekamp, et.al., 1992). esearchers believe that from the time of birth, all children are eady to learn. However, what others do or don't do as individuals, s parents, educators and collectively as society can impede a hild's success in learning. For instance, if parents do not provide dequate health care and nutrition for their youngsters, those chil-ren entering public schools will already be behind their healthier, roperly fed peers. Parental negligence in Early Childhood Care evelopment (ECCD) can result in development defects both physi-al and psychological from early years which can have irreversible ffects on the individual in his/her capacity to learn and participate n productive activities. Educators, on the other hand, planning the urriculum have to consider the developmental stages of the chil-ren. Likewise, specific intervention strategies for ECCD be part of he local government plan for the education of the youth.

Thus, determining the status and problems of Early Child hood Learning Centers (ECLC) in the province would provide the base line of information for the development of responsive programs and projects; to improve the delivery and the quality of early education of the youth. According to Soliven (2001), ECCD can break the cycle of poverty. Research shows that investment in the early years outper-formed other policy options in terms of savings on remedial pro grams. In this regard, ECCD is increasingly seen as an investment with potential educational, social, with economic returns.

For children from poor families, ECE is a time bound opportunity to break the cycle of poverty. Hence, this study aimed: (1) to review the state of development of the early childhood learning centers; (2) to identify problems affecting their development; and (3) to suggest solutions to these problems in order to uplift their state of develop-ment

Research conclusively indicates that children are engaged in physical activities, the cognitive domain of the brain are naturally stimulated (Krull, 1999). Thus, Early Childhood Education Institution (ECEI) curricula have to promote "developmentally appropriate move-ment/ activities". The teachers have the responsibility to give all chil-dren developmentally appropriate movement activities that will in-crease their self-esteem (Krull, 1999). The learning experiences at ECEI would be designed to meet physical, cognitive, social and emo-tional needs of the children.

The curriculum of ECEI would be thematic in approach. This provides a solid foundation on which children will build their knowl-edge, understanding and experience of the world through active play and manipulation of materials. Thematic curriculum should meet the following parameters (Hatch, 1999):

A. Presents the children with many opportunities for success. Presents the children with many opportunities to develop self-awareness through independence and decision-making.

B. Allows children to develop social skills through large group, small group and individual activities and experiences.

C. Challenges the children to examine, explore, investigate and internalize.

D. Provides many opportunities for language development includ-ing pre-reading fundamentals. Sequencing, classification, vocabulary enrichment, listening skills and composition skills.

E. Provides many opportunities for mathematics development including symbols, quantities, spatial awareness, comparison and time measurement.

F. Provides many opportunities for science development including sensory exploration, discovery, inquiry and investigation.

G. Provides many opportunities for expressive learning including art, role plating, music and stories.

H. Includes examples and opportunities for health, safety and nutritional education.

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The curriculum of ECCI would be thematic in approach. This provides a solid foundation on which children will build their knowledge, understanding and experience of the world through active play and manipulation of materials. Thematic curriculum should meet the following parameters (Hatch, 1999):

A. Presents the children with many opportunities for success. Presents the children with many opportunities to develop self awareness through independence and decision-making.

B. Allows children to develop social skills through large group, small group and individual activities and experiences.

C. Challenges the children to examine, explore, investigate and internalize.

D. Provides many opportunities for language development including pre-reading fundamentals. Sequencing, classification, vocabulary enrichment, listening skills and composition skills.

E. Provides many opportunities for mathematics development including symbols, quantities, spatial awareness, comparison and time measurement.

F. Provides many opportunities for science development including sensory exploration, discovery, inquiry and investigation.

G. Provides many opportunities for expressive learning including art, role plating, music and stories.

H. Includes examples and opportunities for health, safety and nutritional education.

I. Provides many opportunities to respect exemplify and appreciate the cultural diversity of the school community.

A. R.A. 6972 and RA 8990

Republic Act 6972, known as "Barangay Level Total Development and Protection of Children Act", is an act establishing a Day Care Center in every barangay, instituting therein a total development and protection of children program, appropriating funds, thereof, and for other purposes (Official Gazette: 1991). Accordingly, Filipino children up to six (6) years of age deserve the best care and attention at the family and community levels.

This legislation provides among other materials and network of surrogate mothers-teachers who will provide intellectual and mental stimulation to the children, as well as supervise play, mental stimulation activities and group activities with peers; and a support system and network assistance from among the members of the barangay for the total development and protection of the children.

the children was approved. This R.A. 8980, the ECCD (Early Childhood Care and Development) Act approved in December 2000, promulgating a comprehensive policy and national system for ECCD and providing funds therefore for other purposes (Official Gazette: 2001).

This Act recognizes the role of the state to institutionalize a National System for ECCD that is comprehensive, integrative and sustainable, that involves multi-sectoral and inter agency collaboration at the national and local levels among government; and among the public and private sectors, non government organizations, professional associations and academic institutions, like Marinduque State College. This System shall promote the inclusion of children with special needs and advocate respect for cultural diversity. It shall be anchored on complementary strategies for ECCD that include service delivery for children from conception to age six (6), educating parents and caregivers, encouraging the active involvement of parents and communities in ECCD programs; raising awareness about the importance of ECCD; and promoting community of life for young children and families.

The objectives of the National ECCD System are the following:

A. To achieve improved infant and child survival rates by ensuring that adequate health and nutrition programs are accessible to young children and their mothers from pre-natal period throughout the early childhood years;

B. To enhance the physical, social, cognitive, psychological, spiritual and language development of young children;

C. To enhance the role of parents and other caregivers as the primary caregivers and educators of their children from birth onwards;

D. To facilitate a smooth transition from care and education provided at home to community or school-based setting and to primary school;

E. To enhance the capabilities of service providers and their supervisors to comply with quality standards for various ECCD programs;

F. To enhance and sustain the efforts of communities to promote ECCD programs and ensure that special support is provided for poor and disadvantaged communities;

G. To ensure that young children are adequately prepared for the formal leaning system and that both public and private schools are responsive to the developmental needs of these children;

H. To establish an efficient system for early identification, prevention, referral and intervention for the developmental disorders and disabilities in early childhood: and

I. To improve the quality standards of public and private ECCD programs through but not limited to, a registration and credential system for ECCD service provider.

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B. The Early Childhood Learning Centers and Its Services

The Early Childhood Learning Centers (ECLC) referred to in this study are the Day Care Centers (DCC) which were established under the RA 6972 known as the *Barangay Level Total Development and Protection of Children Act*. As stated in the Implementing Guidelines of EO 340, the objectives of the day care services are: (a)To provide for proper care and nutrition for the children to make them physically fit; (b) To provide opportunities for intellectual, social, moral, spiritual, emotional and physical development in a safe and healthy venue toward positive child development; (c) To develop strong socio-cultural and nationalistic values as well as positive attitudes towards the Almighty, self, family, community and society in general; and (d) To provide substitute parenting and neglect, abuse and exploitation while parents are at work.

Day Care Center (DCC) as defined in the Memorandum Circular No. 1., s. 1997 of the Department of Social Welfare and Development (DSWD), is a form of day care service which provides care for 3 - 5 years old children by accredited day care workers. This Day Care Service (DCS) is the provision of supplemental parental care to under-five year old children with socially, mentally, psychologically and physically stimulating activities. This is a support service for parents to enable them (parents) to concentrate on their work with the assurance that they (children) are cared off. In case of workplace-based service, it provides care for children during their parent/s working hours. This service should be made available from eight in the morning to five in the afternoon from Monday to Friday.

C. The ECLC Mentors

Based on the Implementing Guidelines of EO 340, applicants for the Day Care Workers (DCW), referred to as the ECLC Mentors, should be screened according to there criteria: (a) Single or married between 18 - 45 years old; (b) With at least two years of college education; (c) With good moral character; (d) With experience in working with pre-school children; (e) With residence near office; (f) Had undergone training related to Early Childhood Care and Development (ECCD) or early communication; (g) Willing to render full time service as day care worker; (h) Willing to sign a contract to serve as day care worker for at least one year and serve as such based on satisfactory performance; and (i) Be physically and mentally fit to work.

With these qualifications of an early childhood mentors or the caregivers, they would be able to provide the children with the developmentally appropriate activities designed to meet the physical, cognitive, social and emotional needs of the children.

Methodology

Research Design

In this descriptive research, survey questionnaires and interview guide were used collect data for this study. Records from the different Municipal Social Welfare and Development Offices (MSWDO) in the province together with the information from the questionnaire given to the ECLC Mentors and the interview of MSWD Officers were the sources of data for this research.

The ECLC Mentors

The list of ECLC mentors from the six municipalities of Marinduque - Boac, Gasan, Mogpog, Sta.Cruz, and Torrijos - were requested from the respective Municipal Social Welfare and Development Officer (MSWDO). Complete enumeration of the mentors was used as respondents of the study. All mentors from the province were requested to answer the survey questionnaire. A total of 209 mentors were the respondents of the study together with the six (6) MSWDO and the PSWDO of Marinduque.

Results and discussion

The Early Childhood Learning Centers (ECLC)

The Legal Bases. The Early Childhood Learning Centers (ECLC) which are popularly known in the country as the Day Care Centers (DCC) were established under the RA 6972 known as the *Barangay Level Total Development and Protection of Children Act*. As stated in the Implementing Guidelines of EO 340, the objectives of the day care services are: (a)To provide for proper care and nutrition for the children to make them physically fit;

(b) To provide opportunities for intellectual, social, moral, spiritual, emotional and physical development in a safe and healthy venue toward positive child development; (c) To develop strong socio-cultural and nationalistic values as well as positive attitudes towards the Almighty, self, family, community and society in general; and (d) To provide substitute parenting and neglect, abuse and exploitation while parents are at work.

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ECLC Marinduque. Out of the 218 barangays, 209 ECLC were established as mandated by R.A. 6972. There are municipalities that had put up ECLC more than the number of their barangays. To cite, Torrijos, has 26 barangays but established 34 ECLC with a total of 932 children; Sta.Cruz has 55 barangays but with 58 ECLC; Gasan with 25 barangays but with 27 centers; and Buenavista with 15 ECLC although they only have 14 barangays. In these mentioned municipalities, R.A. 6972 is not only implemented but more than fully implemented. According to their MSWDO, the reason for the establishment of additional ECLC in a barangay is the distance of the centers from the residence of the children.

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Thus, if the barangay officials and parents of the children requested for another center in the same barangay the request was granted.

However, this study also revealed that there are municipalities in the province, wherein not all the barangays have ECLC. These are Boac and Mogpog, where there are learning centers managed by private individuals and non-government organizations.

C. The Early Childhood Learners (ECL)

Although the municipality of Boac has 61 barangays it has only 46 ECLC, it has the highest number of ECL totaling to 1,042. Next to Boac is Torrijos with 932 ECL, followed by Mogpog with 714 ECL in the 29 ECLC. This municipality has 37 barangays. Next is Sta.Cruz with 710 ECL; Buenavista has the least, 234; then Gasan with 500 ECL.

In the 209 ECLC, the biggest class has 46 learners (Mogpog) and the least is six (6) in Buenavista.

From this 5,844 children now would come the leaders of this province or of this nation twenty years, hence. This is, if all the early learning centers, be public or private, would be able to carry out its function. This province would continue to develop great leaders for this country.

C. ECLC Mentors Profile

Requirements for Mentors. Based on the Implementing Guidelines of EO 340, applicants for the Day Care Workers (DCW), referred to as the ECLC Mentors, and should be screened according to these criteria: (a) Single or married between 18 – 45 years old; (b) With at least two years of college education; (c) With good moral character; (d) With experience in working with pre-school children; (e) With residence near the office; (f) Had undergone training related to Early Childhood Care and Development (ECCD) or early communication; (g) Willing to render full time service as day care worker; (h) Willing to sign a contract to serve as day care worker for at least one year and serve as such based on satisfactory performance; and (i) Be physically and mentally fit to work.

This means that the above-mentioned qualifications of an early childhood mentors or the caregivers would be able to provide the children with the developmentally appropriate activities designed to meet the physical, cognitive, social and emotional needs of the children.

The basic educational requirement for the ECLC mentors is at least two-year college education wherein at this level they have taken college subjects on the psychology of human growth, development and learning/ This understanding of the growth of the children would guide these mentors in the preparation of activities for their learners.

Profiles of the Mentors. Results of the survey show that out of 209 mentors in the province, 86 (41.15%) are high school graduates; 54 (25.84%) are undergraduates; and 69 (33.01 %) are college graduates. Although 41.15 % are high school graduates, almost all of them have attended seminar on ECCD sponsored by the PDSWO of the province.

The study also revealed that all the mentors are female with age ranging from 19 to 65 years old and had been in service with the minimum of less than a year and a maximum service of 24 years. It also shows that there are retirees who still enjoy working in the centers. Their commitment to the service is immeasurable, despite of a low honorarium received.

As to the trainings related to their work as ECLC mentors, as mentioned, they have attended seminar on Early Childhood Care and Development (ECCD) conducted by the PSWDO in coordination with other agencies.

Based from these data, there is a substantial compliance to the implementing guidelines of EO 340 as to the qualifications of the mentors of the ECLC. Although some aspects of this issuance are beyond the scope of this study

D. Problems of Mentors

The common problems expressed by the mentors are their low compensation, the lack of support from parents, lack of the needed educational materials in the centers, lack of support coming from their respective Barangay Council and problem on the physical structure of the centers.

The minimal compensation in terms of honorarium given to the mentors coming from the barangay fund ranged from P500 to P1,000. Considering the cost of living at the present time, this amount is really low. Although it is stated in Section 6.c. of RA 6972 that the monthly allowance, not honorarium, should not be less than five hundred pesos (P500) to be charged to the annual appropriations of the DSWD (Official Gazette: 1991), allowances of these mentors need to be adjusted. If other government employees have their salary adjustments or even the standardization of their salaries, this segment of the civil servants deserves such privileges of benefits, too. They have longed for that same privileges and benefits like other government employees.

Although, these mentors (34.86%) do not consider this as a great problem as evidenced by their length of service, their commitment to their respective centers may, in a way, be affected and consequently the delivery of services of these workers.

Offering trainings for them as early childhood educators will be futile, if there would be better-paying jobs offered to them and they would take that opportunity for a better employment.

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Next to their financial woes, is the lack of support coming from the parents of the children in their centers (25.73%). Parents, being the first provider of ECCD need to be educated as to their role in the care and development of these children. Since 33.01% of the mentors are college graduates, they believed that their centers need the essential educational materials for their learner's activities. This was

This was expressed by the 17.01% of the respondents. Other problems cited by the mentors are the physical facilities of the centers (11.79%) and the lack of support from the Barangay Council (10.62%). Although it is minimal, some of the problems on the physical facilities are the lack of tables, chairs and the location of the center which need to be given proper attention for the safety and security of the children in the center.

It seems they there are communities who are not so much concerned on the development of their youths as indicated by the responses (10.62%) of the mentors. The community has great role in the care and development of the youths as embodied in RA 8980.

V. Conclusion

The results of the study which reviewed the state of the early childhood learning centers provided insights not only on the profiles of the daycare workers and children enrolment but also on the problems affecting the different centers. Among the operational problems including (1) the lack of support from some parents and members of the barangay council, (2) the lack of needed educational materials in the centers, (3) the physical structure of the center, and (4) the low compensation of the daycare mentors, but the most significant is the low level of educational qualifications of the daycare mentors. Most of them had only a high school diploma which is short of the requirements and this led to the development of the Diploma in Early Childhood Education (ECE), a two-year trimester program to backstop their knowledge and skills not only in caring but providing early education considering that the most important stage in the development of the child is from 0 to 8 years old.

Acknowledgment

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HISTORICAL DEVELOPMENT AND RESEARCH PRODUCTIVITY OF MARINDUQUE STATE COLLEGE

CARLOS J. ANDAM , JULIETA L. GO & JULIETA Q. NABOS

ABSTRACT

The paper generally provided the historical perspective of research and development (R & D) function in the Marinduque State College (MSC) and appraised its research productivity from year 2000 to 2006.

In terms of faculty members, MSC maybe considered as a small College serving mainly 6 municipalities of the province. It is the only government agency actively engaged in R & D in the province. Most of its researches were within the confines of socio-economics, education, culture and art studies. It has started from one study and 2 posters in year 2000, increased this to 15 studies in 2002 and 28 studies in 2004, all of which were subjected to the review process of a consortium of which the College is a member. Thereafter, the number of studies reviewed declined. From 2000 to 2006, a total of 243 studies were conducted by around 30 faculty members. A total of 81 research outputs were published in its in-house publications like a technical journal, a newsletter and research review proceedings. Of the total studies, 48 were still unpublished.

Through the years, MSC has likewise formulated its R & D thrust considering the strength of the faculty and accreditations. With this, a total of 8 programs, 9 projects and 4 studies were developed and approved in 2004. Through time also, its management structure was revised three times from 2000 to 2006, the latest of which provided the Office of the vice President for Research and Extension with additional specialized and support services units.

Earlier initiative to organized R & D started even before 2000 but was not really successful as gauged from research productivity and publications. This observation maybe due to faculty composition, human environment, leadership, and fringe benefits.

Key words: research productivity, research and development, Marinduque, science educators

INTRODUCTION

Tertiary education institutions like Marinduque State College (MSC) are expected to discharge their mandate through instruction, research, extension and later on production was added. The origin of trilogy functions could be traced back in the early 1900 with the opening of the University of the Philippines College of Agriculture (Sison, 1984). It is believed that this was patterned after those of the land grant colleges and universities in the U. S. (Lasap, 1987).

Section 2 of Batas Pambansa Blg. 377 mandates the Marinduque Institute of Science and Technology, now the Marinduque State College (MSC) by virtue of R.A. No. 6833, to primarily provide instruction, training, research and advanced studies and progressive leadership in the fields of agricultural, mining, fishery and industrial education, and Section 8 to provide vocational training to adult citizens and out-of-school youth with the cooperation of government and private agencies.

Subsequently, R.A. No. 8292, otherwise known as the Higher Education Modernization Act of 1998, mandates State Universities and Colleges (SUCs) to establish research and extension centers for the promotion of their development. This is complemented by National Budget Circular No. 461 clearly indicating the four functional areas of SUCs such as instruction, research, extension and production for the development of the institution, faculty and the community where a particular SUC operates. These functional areas are supportive not only to the instruction function but compliments with one another in promoting development.

In view of these developments, the management approved on 20 July 2000 through MSC-Board of Trustees (BOT) Resolution. No. 15, the organization of the Technical and External Affairs Department (TEAD), integrating the 3 functional areas of MSC plus the external affairs of the College. The management decided to place the external affairs in the department's supervision in view of its vision to harness the support of the alumni, local and national government agencies, non-government organizations, private companies and international agencies to support the development of the faculty engaged in research and extension activities, the college and the province as a whole.

In 2003, the MSC-BOT authorized a Management Review Team (MRT) including a Curriculum Review Team who reviewed the organization, management and programs of the College. The MRT recommended the realignment of 2 units of the department leaving the research unit and extension unit under an Office of the Vice President for Research Extension and Linkages (OVPREAL). The Board approved this recommendation on 16 January 2004 through MSC-BOT Resolution No. 4, Series of 2004 (Vitto & Andam, 2004). The latest reorganization was endorsed by ADCO in April 2006 and subsequently approved by MSC-BOT placing under its supervision 2 specialized units and 2 support services units. The acronym of OVPREAL was likewise shortened to Office of the Vice President for Research and Extension (OVPRE).

This paper was prepared to review the history of research and development as a function in MSC and appraise research productivity of the College from 2000 to 2006.

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METHODOLOGY

Marinduque is an island province in Southern Tagalog region of the Philippines. Unlike in other provinces of the country, there is apparently no research agency tasks to do R & D except MSC which is still needing so much development in terms of its technical and infrastructure capability. In fact, seldom that one would see labels of ongoing research in the field especially for agriculture and resources research and development.

The data used in this paper were taken from the Office of the Vice President for Research and Extension and from the Marinduque Research and Development Information System of the Center for Scientific Information Management. Because of the absence of documentation and written reports before the year 2000, interviews with some faculty members were done to trace the history of the R & D in the College and in the province.

The data on faculty members were taken from the Human Resources Management Office of the College. Other reports which were found to be authentic were likewise used in the preparation of this paper.

RESULTS AND DISCUSSION

The Faculty as the R & D Arm of the College

The most important assets of colleges and universities are not their buildings but rather the intellectual capabilities of their faculty. The faculty is the driving force behind programs of teaching and research. The university [college] is the one institution in the state specifically charged with and expected to make significant contributions through research (Bland et. al, 1996) in the province of Marinduque since this is the only state institution charge with that function.

Faculty members would like to be considered as scholars and not just teachers. They believe that research and teaching are complementary and not competing activities (Winkler, 1992b). Leaders in education have indicated that research activities enhance faculty knowledge and increase their enthusiasm to share such knowledge with the students (Winkler, 1992a), all of which enriches the student learning experience.

In 2000, only more than 100 members constituted the faculty of MSC, both regular and part time and out of this, only one in year 2000 was doing research but who was not yet a published author. In year 2006, the faculty has grown to at least 150 for both regular and partimers.

Research Productivity

While there are people questioning the quantity or number of research as a gauge of research productivity, there is no consensus as yet on an alternative measurement. Hence, research productivity in terms of the number of researches and publications still prevails in many research institutions throughout the world. It is also becoming a measure of the strength and productivity of academic institutions. It is an important element in the equation for excellence. In addition, through their research publications in the major journals, faculty members disseminate their research findings around the world. Such scholarly activity brings visibility and prestige to the authors and their institutional affiliations (Im & Kim, 1998).

In the first quarter of 2000, the task of organizing a research and development department was assigned naturally to the Vice President for Research and Extension. The College then has already established the Academic Affairs Department which is generally the case in the colleges and universities, and the Administrative Department. The President then that time said that he would like to complete the College. The attempts to organized was evident from the history of the College, for example the designation of an Extension Director and later on a Research Director and even designating other faculty members to assist the Directors but the initiative did not successfully worked out.

In the same year, I sent 10 faculty members to attend a training-workshop on research proposal preparation writing organized by University of the Philippines Los Baños and the Commission on Higher Education. Two of the faculty members eventually made it to do research. In the ensuing years, I organized training-workshop in MSC on same topic with resource persons coming from the Philippine Council for Industry and energy Research and Development (PCIERD). Around 30 faculty members attended and 4 of them are doing it now. University of the Philippines Diliman came over and conducted another seminar on research attended by some 25 faculty members. Some of them made it. In addition, the Vice President personally assists faculty members who are showing interest on R & D and this approach seems to be more effective.

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In year 2000 also and in consonance with MSC's membership in the Southern Tagalog Agriculture and Resources Research and Development Consortium (STARRDEC), the Annual Regional Symposium on Research and Development Highlights was hosted by the College on August 24, 2000 in Boac Campus. Only one research paper and two posters were presented during this symposium.

As a STARRDEC member, the First Agency In-House Review (AIHR) of MSC was conducted in the year 2002. Spearheaded by TEAD of the College, research productivity was noted at 15 studies and one research project proposal from various research and development units in the province including the Philippine Rural Reconstruction Movement (PRRM) and units of the provincial and municipal governments although bulk of the studies reviewed were expectedly done by the faculty members of the College (Andam, 2004b).

A total of 28 studies were reviewed during the second AIHR on 26 – 27 February 2004. Significantly, this feat places MSC in the forefront of R & D in the province of Marinduque. Four studies came from the Department of Education in the province and the rest from MSC's faculty members (Andam, 2004b).

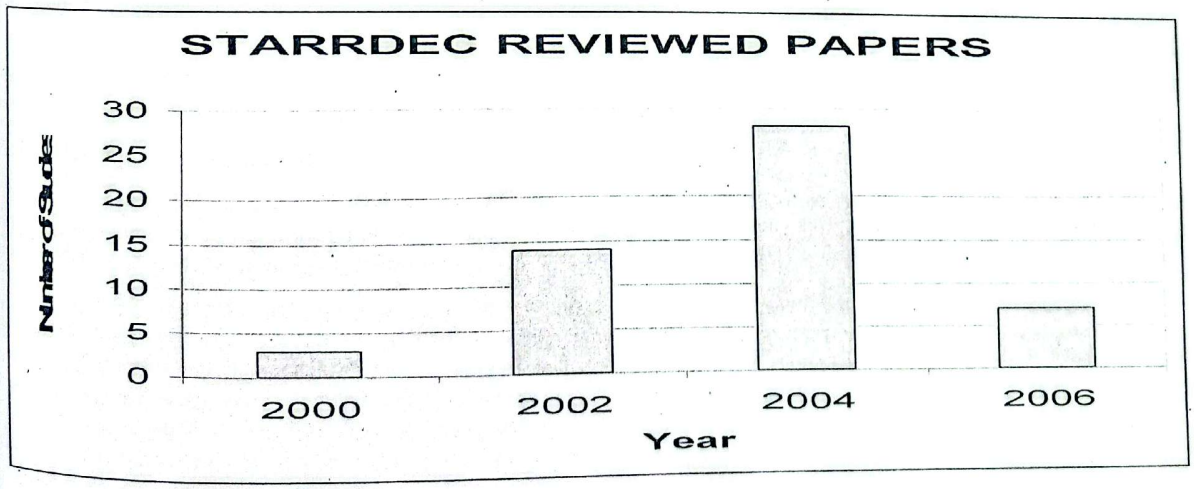
In April 2006, the MSC-STARRDEC Agency In-House Review was organized and conducted wherein only 7 studies were reviewed.

Table 1 and Figures 1 and 2 show the overall picture of R & D productivity of the college from year 2000 to 2006. Most of these studies were not provided with funds from the College or from other sources. In fact, this was noted by STARRDEC when our membership was elevated from associate to regular. STARRDEC suggested to accord our faculty-researchers with some form of incentives like honoraria. However, this has yet to materialize.

Table 1. Number of completed studies and published papers.

YEAR	TOTAL COMPLETED STUDIES	PUBLICATION				REMARKS
		MSC Journal	The Blue Font	Marinduque Review	Unpublished	
2000	16	9	7			
2001	22		22			
2002	14			14		
2003	6				6	Offshoot 3
2004	28	15			28	2nd STARRDEC Review
2005	21	14			7	R&E Review
2006	7				7	R&E Review

Figure. Number of studies conducted by the College.



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Technical Assistance to Science Educators

One of the early programs to make OVPRE be felt in its existence and responsive to the community and to promote the development of R & D culture is an extension of our agency in-house R & D review system. All agencies including non-government organizations known to have R & D activities in the province are invited to present their outputs. This was a very challenging and inspiring because up to now, schools under the Department of Education subject the investigatory works of their students to our review process similar to the STARRDEC AIHR system with the students presenting their research outputs. Initially, it was part of the AIHR wherein the same evaluators of MSC research papers review the papers of the students. Of course, it is a very hectic task on the part of the reviewers because there were times wherein the review lasted up to 9:00 or even 10:00 in the evening.

This review is done every year before they joined competitions in the regional and national levels. The students also make exhibits of their research output right there in the venue and it is part of the review process. Two years ago, thinking that many faculty members learned from the STARRDEC-AIHR, the review of investigatory works of students was separated and spearheaded the science coordinator of the Department of Education. Faculty members on a voluntary basis serve as the reviewers.

Feedback from the science advisers of the students revealed that the system is effective. Evidently, from the time we started up to the present, the student-researchers consistently garnered awards of various categories and recognition in their projects every year both in regional and national competitions.

Setting the R & D Thrust of the College

At the onset of the approval of the Technical and External Affairs Department in 2000, four R & D areas were recognized as the framework or focus of the College in the ensuing years. These are the following:

Hillyland and Cogonal Areas

Environment and Indigenous Resources Development

Coco-based Farming Systems

Marine and Aquatic Resources Development

While these areas are more on agriculture and resources research and development, there is a need to address the R & D functions of the other schools under the College because of the requirements of CHED, Department of Budget and Management (DBM) and the Philippine Association of State Universities and Colleges (PASUC) and so with the requirements of various accrediting bodies. In view of this, we thought that there was a need to review these R & D areas and in early 2005, we set in motion the formulation of the R & D Thrust and Priority Areas for a five year period. Change in leadership including leaders in our R & E up to the school level and the introduction of the Office of the Campus Director Offices in the management structure of the College somehow affected the preparation or implementation of the thrust and priority areas.

Then, a Provincial R & E Consultative Workshop was held on March 23 – 24, 2006. This activity was intended to determine research and extension gaps, identify priority areas and come up with flagship programs and other projects for development with the local government units and non-government organizations. More than 20 agencies and organizations attended the activity.

Project Development Through the Years

From year 2000 after the creation of the TEAD, many R & D project proposals were submitted to various agencies for possible funding. However, these were not followed up after there was a change in leadership of the College and in fact, many of the on-going projects then were discontinued. Nevertheless, at the end of 2005, we were able to raise our level in the DBM leveling.

In 2004, three activities were conducted to initiate the conceptual development and preparation of project proposals. Two fora were devoted to the conceptual enrichment of a butterfly research center and a forum on the state of the butterfly industry in Marinduque. These were attended by 10 and 15 participants from various sectors, respectively. Resolutions from the participants and the Municipal Councils of Boac, Mogpog and Gasan supported and which led to the completion of a proposal on the establishment of the "Butterfly Research and Development Center of the Philippines" in MSC. It was supported by the ADCO of the College through Council Resolution No 45, series of 2004. The MSC-BOT however deferred its approval due to a comment from the private sector representative. Until now, the proposal has not been returned to the agenda of the board.

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In an effort to enhance the participation of the faculty, we organized an R & E project proposal writing seminar followed by a planning-workshop for our Gender and Development Program in 2005.

Table 2 shows the approving categories of the College and the number of R & D project proposals during the year 2004 and which were reported to the MSC-BOT during their second meeting in 2005.

Table 2. Number of approved projects in 2004.

Approval Category	Number Programs	Projects	Studies
MSC - BOT Approved	2	2	
MSC-ADCO Approved	5	2	
RECO Approved			1
President Approved	1	3	
Projects Proposal for RECO		2	
Project Proposals R & E Review 2006			3
Total	8	9	4

CONCLUSION AND RECOMMENDATIONS

We have shown at MSC that even if there is no budgetary allocation for R & D, some appropriate activities maybe done. These are more on the socio-economics, education and culture studies. Very minimal experimental studies especially in agriculture were conducted during the years covered by this paper. This is because this type requires resources especially financial resources to pursue a given experiment. Financial resource should be made available to deserving research especially those in line with established thrust of the College.

It is very important to continue nurturing the interest of faculty members in doing research because of the many accreditations that are being undergone. However, there is also a need to complement this initiative with some form of rewards and recognition if we are to sustain their interest especially those who are actually engaged in R & D activities. All leaders from the school level up must be with interest and experience in R & D and researchers themselves so that they would understand how to manage R & D activities.

The technical assistance to science educators in the province should continue as this viewed as increasing the visibility and credibility of the College. This is a low cost strategy of educating the public as there is a multiplier effect through the students and science advisers.

Beginning researchers should be encouraged to start with inexpensive studies, possibly those that can be done with their students. Collaborations with the local government units must be pursued vigorously especially those that would equip farmers with the technical information on increasing their income.

The OVPRE has undergone 3 reorganizations in a short period of time. This should be minimized to stabilize the R & D office. After all, the culprit in declining research productivity is not always the management structure but people factor or resource is.

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THE TRADITIONAL HEALERS OF THE ISLAND OF MARINDUQUE

CARLOS J. ANDAM & EMMA CABILDO

INTRODUCTION

Indigenous knowledge (IK) represents the richness of the poor (Ulluwishewa 1993) but is often unknown to many people including development professionals because it remains only in the minds of local people, unwritten and unpublished unlike knowledge generated through the scientific method. But lately, IK has been espoused by many researchers and development workers both here and abroad as an important resource for effecting development. For example, Sajise and Ganapin (1990) expounded the importance of IK in relation to upland development planning which according to Ulluwisshew (1993) facilitates the participation of beneficiaries of development projects. The traditional healers therefore are equally important as sources of knowledge who deserve to be understood because of their knowledge's potential contribution to the pharmaceutical and medical industry. Studying them likewise could provide the impetus to a renewed interest in promoting traditional medicines including herbal gardens in the island province of Marinduque in view of the high cost of medicines and laboratory examinations.

Many literatures have covered indigenous or traditional medicine (de los Santos, 2001; Ladion, 1989;) but these are more on the herbs or medicinal plants used by the traditional healers. Studies on the traditional healers themselves as practitioners of the of the enterprise are wanting not only to understand them but to learn from their knowledge and experiences and gain insights on their wisdom. Even the recent work of Sapungan, Makiling and Matining (2003) in Marinduque has not gone deeper on the characteristics of the "herbolarios" or traditional healers but more on the different kinds of medicinal plants they used in curing illness of their patients.

Hence, this study on benchmarking the traditional healers is important in understanding the practice of the enterprise on traditional medicine. In general, the study appraised some characteristics of traditional healers with the following specific objectives of the study:

To gain insights and lessons on the background and experiences of traditional healers; and

To identify problems in the practice of traditional medicine in Marinduque.

MATERIALS AND METHODS

The study was conducted in the island province of Marinduque from November 2008 to June 2009. It made use of a questionnaire which was designed to record responses of traditional healers who were chosen by simple random sampling from barangays that were likewise chosen by simple random sampling. That is, after choosing the barangays, the healers were chosen and interviews followed.

The questionnaire was developed to cover the following information: age, religion, educational background, length of experience, major occupation and other sources of income, sources of indigenous knowledge, payment or selling of medicinal plants and problems and solutions. The questionnaire was pre-tested and subsequently revised to accommodate improvements gained from the pre-testing.

Before conducting the interviews of respondents, student enumerators were oriented on the questionnaire and trained on how to conduct the interview.

Filled-up questionnaires were edited for consistency and later on entered in a columnar sheet. Dummy tables were prepared as guide in analyzing the data. Frequencies and means were computed from the data.

RESULTS AND DISCUSSION

Profile of Herbalists

There are more female (64%) than male (36%) herbalists in Marinduque. Most of them are married (84%). The rest are widow (13%) and single (3%).

The data in Table 1 shows that the youngest herbalist is 23 years old while the oldest is 99 years old. As age increases from 23 to 66 years, the number of herbalist's increases also. Beyond 66 years, the number of herbalists declines as age further progresses.

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Table1. Age bracket of respondents.

Age Bracket	Frequency	Percent
23-33	6	3.14
34-44	23	12.04
45-55	45	23.56
56-66	61	31.93
67-77	41	21.46
78-88	14	7.32
89-99	1	0.53
Total	191	100

In terms of religion, the Catholics dominate the herbal enterprise (Table 2). Almost all herbalists interviewed belong to this denomination. This is not surprising as the Philippines is a catholic country, the only in Asia.

Table 2. Religion of the respondents.

Religion	Frequency	Percent
Catholic	183	94.32
Aglipay	5	2.57
INC	2	1.03
Jehovah's witness	1	0.51
Adventist	1	0.51
Born again	1	0.51
Baptist	1	0.51
Total	194	100

Table 3 reveals the educational background of the herbalists. The data indicates that the number of herbalists declines consistently as the number of years in formal education increases. Very few of them have gone beyond secondary education.

Table 3. Educational background of the respondents.

Experience as Herbalist

The number of years performing herbal enterprise may indicate a wealth of knowledge. In the present survey, around 30% of the herbalists have a decade of experience in the enterprise. Around 50% of them, however, had 12 to 33 years of experience in the enterprise. Beyond this length of time, there was less number of herbalists who were interviewed during the survey.

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Table 4. Number of years as an herbalist.

Years as Herbalist	Frequency	Percent
01-11	45	29.41
12-22	39	25.49
23-33	38	24.83
34-44	18	11.76
45-55	9	5.88
56-66	4	2.61
Total	153	100

Occupations and Other Sources of Income

The practice of herbal medicine in the Philippines is generally not considered as an occupation although the present survey indicates an emerging picture where 13 of the respondents reported that their practice of herbal medicine is their major occupation (Table 5). It was however beyond the scope of the study to determine the amount of income they derived from the practice.

Farming constitutes a major occupation by some 42 herbalists. This is followed by housekeeping, vending and then the practice of herbal medicine, in descending order (Table 5). There are other major occupations of herbalists aside from these occupations and some even are related to allied medicine such as therapy and reflexology. A nurse and a midwife are reported to be practicing herbal medicine.

Table 5. Major occupation of herbalists.

MAJOR OCCUPATION	FREQUENCY	PERCENT
Farmer	34	22.66
Housekeeper	33	22.00
Vendor	13	8.66
Herbalist	13	8.66
Barangay Official	9	6.00
Carpenter	7	4.66
Copra worker	7	4.66
Midwife	6	4.00
Fisherman	5	3.33
Store keeper	4	2.66
Therapist	3	2.00
Laundry	3	2.00

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Table 6. Other sources of income.

Other Sources	Frequency	Percent
Hog raising	11	11.22
Herbalist	10	10.20
Butterfly farming	10	10.20
Laundry	7	7.14
Vendor	6	6.12
Farming	6	6.12
Brgy.official	5	5.10
Therapist	5	5.10
Copra worker	5	5.10
fisherman	5	5.10
Pension	4	4.08
Pension	4	4.08
Nitto weaving	3	3.06
Food building	2	2.04
Selling charcoal	2	2.04
Store owner	2	2.04
businessman	2	2.04
Dress making	1	1.02
Security guard	1	1.02
Faith healer	1	1.02
Selling nipa	1	1.02
Selling bamboo	1	1.02
Housekeeper	1	1.02
laborer	1	1.02
carpenter	1	1.02
Maid	1	1.02
Total	98	100

Sources of Indigenous Knowledge

Knowledge on traditional medicine is important not only in the uplands and rural areas but for as long as modern medicine continues to become expensive beyond the reach of poor people. In fact, herbal medicine as an alternative means for the poor would thrive. One of the contributory factors the knowledge to thrive is the transmission system. In Table 7 are shown the different sources of indigenous knowledge (IK) on the practice of herbal medicine in the province of Marinduque. Generally, the respondents' knowledge on herbal medicine was acquired through inheritance from their ancestors. It can be noted that IK sources on herbals reflects similarity with those in Kenya (Munguti 1997).

Munguti (1997) reported that the social dimensions used to determine the efficacy of indigenous medicine, one of which is the manner in which the individual became a practitioner. Some come from a long line of practitioners, whereby indigenous knowledge has been handed down from father to son or mother to daughter. Others were trained by a highly recognized practitioner.

Only few of them (19.62%) reported acquiring or learning from formal studies, training, and seminars, through experience and through reading books on herbal medicine. Only 5.32% among the respondents said that their knowledge on herbal medicine has relationship with their religious belief.

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Table 7. Sources of indigenous knowledge on herbal medicine.

IK Sources on Herbal Medicine	Frequency	Percent
Learned from Parents	43	26.38
Learned from Other Herbalist	27	16.56
Inherited	25	15.33
Acquired through reading books	13	7.97
Learned from Ancestor	11	6.74
Experience	10	6.13
Religious belief	10	6.13
Formally studied	6	3.68
Training/seminar	6	3.68
Learned from Grandparents	5	3.06
Learned from Relatives	4	2.45
Learned from Husband & Wife	3	1.84
Total	163	100

Herbalism is Becoming a Trade

While the survey did not cover determination of the earning of herbalists from their practice, the result somehow shows an indication that the practice of herbal medicine in the province is becoming a trade. About one-fifth of them (16.94%) revealed that they are collecting fees from their patients. In the highland of Ecuador, Kühlen (2008) reported that local health promoters rarely take any money, and are given eggs, some flour or a chicken instead.

In addition, 7.14% of them reported selling their herbal plants to users.

Problems and Proposed Solutions

The problems presently encountered by the practitioners of traditional healing are varied and enormous but the present study considered only two major problems that the respondents identified as important based on their experiences with their patients, to wit:

Source of medicinal plants. This is very important to the practice of healing as this will spell the availability of supply locally to their prescription. Under this category, some of them reported lack of supply of the medicinal plants, that it is difficult to gather in the mountains and the source is very far, insufficient plants in the garden or nearby the house, and only few now plant or maintain a herbal garden.

Herbal garden was promoted in the past by the government and some non-government organizations and its promotion should be intensified as part of any vegetable gardening in the homeyard. Some of the medicinal plants anyway are herbs which can be used in viand preparations, and some even are for fresh fruits.

Slow curative power. There are patients who have the propensity for fast curative power and immediate results from the traditional healing process. Because of this, some patients misunderstood or belittle the power of the healers or even do not believe them anymore.

If herbal gardening revived and intensified, information dissemination through orientation and seminars on the healing powers of herbal plants should be done to intensify public awareness.

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TECHNOLOGY MANAGEMENT: STATE OF "BIOGASINATION" IN MARINDUQUE

Carlos J. Andam

ABSTRACT

The study was conducted mainly to document and analyze the processes in the promotion of intensified biogas technology utilization ("biogasination") and draw lessons and insights from the experiences of the Department of Science and Technology (DOST) as the prime mover of the technology in Marinduque.

The introduction of the technology was assigned to a technical staff of DOST-Marinduque. This campaign initiative immediately started with an informal seminar for the purpose and individual follow-up with those who indicated interest on the technology. On the average, it took the technical staff 3 visits to those who were interested then to finally schedule the construction of their biodigester of which DOST-Marinduque coordinated with DOST-Rizal and facilitated their engineers for technical assistance. Probably, this is the major cost shouldered by DOST-Marinduque plus the transportation expenses of the technical staff of DOST-Marinduque in following up and coordinating with the adoptors. This would make the informal strategy cost effective in technology promotion and adoption considering that the initiative generated a total of P 316,000 investments among the 7 adoptor-cases or approximately P1.00 investment as cost in technology promotion for every P31.60 investment generated for the construction of biogas system.

The adoptor-cases believed that the technology is expensive. On the process of technology promotion, there are problems though these provided the opportunity to learn and draw insights for improving the technology promotion initiative in the province. This stems from the lack of complete and comprehensive information on the varied uses of biogas technology, proper management of the digester, and lack data on savings resulting from having a biogas unit. The last one is necessary to rationalize the initial investment on the digester.

To enhance the rate of technology adoption necessitates working with the local government for policy measures to extend soft loans whereby the monthly amortization is equivalent to the monthly expenses, for example, on liquefied pertroleum gas or LPG that a household or enterprise buys for their daily cooking so that there would be no impact on their coffers. Reversing the strategy by promoting backyard animal raising so that there would be a readily source of manure for the digester maybe worth trying. A technology manager specifically for biogas technology promotion and commercialization and to be drawn from the R & D workers in the province is necessary not only to assist DOST-Marinduque but to make the program visible and to champion biogas technology.

Keywords: biogas, biogas technology, energy, fuel, farm wastes, digester

INTRODUCTION

Development of alternative energy sources from locally available resources like farm wastes is generally a neglected dimension of rural and agricultural development. The biogas technology is a practical solution to alleviate high energy cost and the increasing requirement for local firewoods due to the increasing requirements of a rapidly growing population. However, the adoption of this technology is very slow up to this time.

"Biogasination" in this study refers to the promotion of intensified utilization of biogas generated from wastes in government institutions, educational institutions, business and livelihood enterprises dependent on energy to produce goods and services, as well as households who have the means, the wastes in their backyard, and the need to reduce the cost of fuel consumption in cooking the family meals. Available literatures indicate that during both world wars, many farmers set up biogas plants. In 1952, there were over 1,000 plants in France but most have now been abandoned (Hunkin, 2001). In India, where biogas research is leading the world over, more than 2,500 plants are in operation and the cow dung is used as feed to the digester. In some parts of that country, however, the cow dung is collected and dried and then sold as fuel for cooking (Hunkin, 2001) thereby directly competing for its use in biodigesters. In the early part of 1985, Thailand had about 400 biogas digesters but only 39% was then operational. Of the total number of units, 80% were privately owned, 16% by local health centers and the rest by monasteries. Actual utilization of biogas, either using livestock waste or agro-waste in Malaysia is minimal so that only a few biogas plants can be found then (Alicbusan, 1985) in the same year.

The slow adoption of the biogas technology may be attributed to various reasons. Felizardo (1985) averred that existing biogas systems known, used and constructed have been found to have many difficulties in construction, installation, operation, maintenance and also of the quality of the product output. One is, in the concrete type, there is a danger of high water level due to the inherent below the ground level construction, not to mention the incidence of leakage.

Another one according to Felizardo (1985) is, frequent opening and cleaning of the system is necessary with the concrete type. Yet, this system generates corrosive and mal-odorous gases together with the biogas and it also produces a toxic liquid sludge which is a product of fermentation. The system thereby increases the pollution problems of most of the livestock raisers.

In addition to the above drawbacks, Felizardo (1985) mentioned that the concrete or septic tank biogas system has to be closed and its operation stopped whenever the system is to be cleaned, thereby interrupting biogas production and at the same time causing the accumulation of waste manure.

Recent developments or modification of existing models have made great improvements in the application of the biogas system. The model being introduced by the Department of Science and Technology (DOST) is shown in Figure 1 (DOST IV, 2006).

The study was conducted 1) to document the process of technology commercialization; 2) to synthesize case studies of adoptors and draw lessons and insights on the process of promoting the technology; and 3) to suggest strategies that would enhance biogas technology commercialization.

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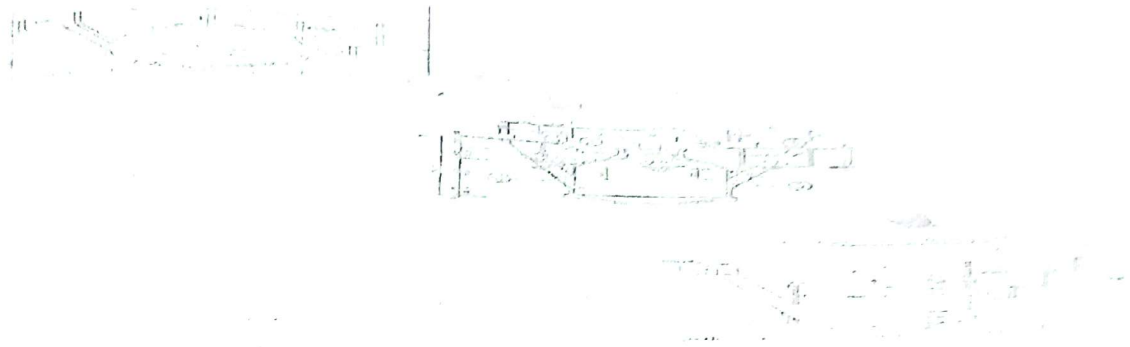

Figure 1. Biogas digester being promoted by DOST IV (2005).

METHODOLOGY

Data for the study were based from the works of Onte, Villanueva and Sajul (2007) of the School of Industrial Technology of the arinduque State College (SIT-MSC). These were supplemented with interviews with the 7 owners of the biogas system case studies.

A separate interview was conducted with the technical staff (Bernardo Caringal, Science Research Specialist) of DOST-Marinduque. is was to collect information on the processes involved in introducing the biogas technology and some details of the technology.

Among the 7 cases, 2 are owned by the local governments of Mogpog and Gasan, one is owned by MSC and the rest are privately ned specifically family households.

It should be noted that there was no promotional activities of the technology from January to December 2007 because the technical ff of DOST-Marinduque was on study leave. Also, one very important personality in the DOST-Marinduque biogas technology promotion iative, Mr. Jayson Simon, Instructor and Head of the animal science unit of MSC has already left the College and is not available for inter- w during the conduct of the study.

RESULTS AND DISCUSSION

chnology Promotion

The history of biogas utilization shows independent developments in various developing and industrialized countries (ISAT-GTZ, tated). In their study, Maramba et al. (1988) reviewed the historical development of the biogas technology and readers may refer to their er. There's evidence that biogas was used to heat bath water in Assyria during 10 BC; and the first digestion plant to produce biogas n wastes was built in a leper colony in Bombay India in 1859 (Kangmin and Ho, 2006) and developments followed in England and coun s like Algeria, USA, Germany, Taiwan, South Africa, China and Philippines.

The introduction of biogas technology in Marinduque began in year 1997 at the School of Agriculture of the Marinduque State Col- e. This was at a time when the school was still implementing the Philippine-Australian Agri-Tech Program. One unit was built then as a wcase primarily to its students in the Diploma of Agricultural Technology (DAT) and Bachelor of Agricultural Technology (BAT). The model a low cost material using PVC tube. This is one of the projects implemented by Mr. Jayson Simon as Instructor of MSC-SA and as Head he animal science unit of the school. It was operational then for about 2 years but unfortunately it did not last long because one of the ool's animal's went astray and accidentally stepped on the structure thereby damaging the digester.

In year 2002, DOST-Marinduque introduced the model biogas digester being promoted by DOST-Rizal mainly to alleviate the en- y crises recurring in the country due to the increasing cost of importing crude oil.

Only one activity started it all in Marinduque and that was to bring the technology to the School of Agriculture of the Marinduque e College (MSC-SA). Being an animal science major, the head of the animal science unit of the school, Mr. Jayson Simon who was In- ctor then, had no second thought on the technology. In fact, he was responsible for the first biogas project in the in 1997. With the techni- staff of DOST-Marinduque, they agreed on the schedule of arrangement of the construction of the digester including technical assistance n DOST during the construction. DOST-Marinduque in turn facilitated the technical assistance of DOST-Rizal to supervise the construc-

During the construction, the DOST technical staff took advantage of holding an informal orientation seminar on the biogas technol- to share the advantages and benefits as well as the practicality and simplicity of construction of a biogas system as source for fuel even rdinary household cooking. This was in November 2002 and it was attended by 15 students and 5 faculty and staff of MSC-SA.

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The DOST-Marinduque technical staff admitted that Mr. Simon had a big role in the technology promotion. This is so as he goes around the province frequently to visit hog raisers whom he was providing technical assistance that gave him at the same time the opportunity of disseminating biogas technology as part of the hog raising system. Soon he learned the technical aspect of the digester construction and he continued the campaign and, in fact, he alone supervised some of the construction of digesters in the province. The students of MSC-SA according to Mr. Caringal had likewise contributed in the dissemination of the technology.

DOST-Marinduque also sent Municipal Engineer Emilio Sosa of the Municipality of Gasan for training on the technology in DOST-Rizal. After that, he was able to introduced the technology to a family who eventually had their own biogas system in which he supervised the construction of the digester.

Also, after completing the biogas system of MSC-SA and showing that it works, DOST-Marinduque informed the Provincial Agricultural Office and Municipal Agricultural Offices and suggested to them to visit the model. Additionally, there were many buyers of piglets at MSC-SA at that time so that many of them witness an operational biogas system.

In 2006, DOST-Marinduque accompanied hog growers of Boac in visiting the system of the municipalities of Mogpog and Gasan and a household one in Sumangga, Mogpog.

Synthesis of Biogas Technology Adoption Case Studies

This section provides an overview of the important findings in the 7 cases covered in this study.

This recent initiative of DOST-Marinduque of introducing the biogas technology in 2002 was actually a re-introduction of the technology considering that MSC-SA had already one in 1997. There was no promotional activity in January to December 2007 because the technical staff of DOST-Marinduque was on study leave. That was also the time when the Provincial Science and Technology Officer is still on detail at DOST-Quezon so that nobody then continued the program last year.

Two of the cases are owned by local government for their abattoirs, one is owned by MSC-SA, and the rest are privately owned mainly for family use. None of the four privately owned biogas system is used or was intended for livelihood/business undertaking. The owners are families who are in their active economic life, ages ranging from 30 to 54 years old. They were convinced on the benefits/advantages of having a unit of their own. They are more definitive on the use for family household cooking. On the other hand, the interest of the local government on the technology is anchored mainly on the reduction of electrical energy expenditures and as pollution control measures in their slaughter houses.

Table 1 shows some of the characteristics of the owners and their biogas systems. Household size of private owners ranged from 5 to 10 or an average of seven members per household. The biogas they produced is mainly for household cooking of their meals. There is no indication on the relationship of the number of household members to the size of the digester based on the data gathered from the private owners of the biogas system. This is because the source of the manure for the digester has been there already existing when the units were constructed. The size of the digesters ranged from 1.0 cu m to 6.3 cu m.

Except for MSC-SA which is a government agency, construction costs were higher in the local government's biogas system because they were intended for bigger operations than the household. Correspondingly, their digesters were bigger and the cost ranged from P52,000 in Mogpog and P100,000 in Gasan depending on the size of the digester. The total investment of the 7 adoptor-cases amounted to P316,000.

Aside from MSC-SA having a biogas unit earlier than DOST's introduction in the province, all information gathered from the seven cases points out to DOST-Marinduque as the sole source of their information about the technology. That the provision of technical assistance from other units of DOST were all coordinated by DOST-Marinduque. Experts from DOST-Rizal provided technical leadership only during the construction of the first digester and that in the MSC-SA. The rest were supervised by Mr. Jayson Simon except for one unit which is not operating up to this time.

The problem on leakage as reported by one user requires technical inspection and DOST should find time to visit the unit. While this is only one case among the 7 adoptor-cases studied, this may dissuade or discourage would-be owners in the future. Having an assurance to attend to technical problems arising after construction would make them more assured that somebody can be relied upon through time. Abandoned units would also taint public image of promoters including DOST and may ruin their image in technology commercialization in the province.

While the present users know the uses of biogas, not one among them reported using the by-product sludge as fertilizer. This is one indicator of the limitations of the present technology promotion initiative which may have contributed to slow adoption of the biogas technology. An appreciation of all possible benefits from adopting a technology could significantly contribute in increasing the number of users. Information about the technology should therefore be complete and comprehensive.

One of the problems reported by the users is the insufficiency of manure to continuously feed the digester. This only implies that in the design of the digester and the source and volume of manure are important consideration in the construction of the digester.

Maintenance like cleaning where water is needed as raised as a problem by another user may not be a problem at all once there is full appreciation of the system. It only becomes a problem if water is totally lacking in the site.

The experience of the 7 users is in general encouraging and shows no serious technical problems that may preoccupy R & D workers. Maybe the challenge, but which may be another approach in promoting the technology, is to reverse the campaign by promoting backyard animal production in order to have readily available sources of manure for digesters. This approach has the twin goals of turning wastes into beneficial resource and productivity to alleviate poverty.

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Design of the Digester. Through time, the technology has undergone modifications for its improvement in terms of simplicity in construction and ease in maintenance. While the technology being introduced is the model of DOST-Rizal as shown earlier in Figure 1, construction in Marinduque generally had slight modification as shown in Figure 2.

Strategic Site for Technology Diffusion. It is interesting to note that after the digester construction, the informal orientation seminar, and after it was shown that the system operate well, the technology diffused to other people. DOST-Marinduque recognized that Mr. Simon as well as the students of MSC-SA was very instrumental in promoting the technology. The choice of the initial activity in introducing a technology is very important. The very nature of the school system makes it a strategically important launching pad for the introduction of the technology. This is because of the crowd of the faculty and students who would consciously or unconsciously spread the news about a technology in their lessons, discussion or relating it to their family, relatives or friends.

Problems and Suggestions. Based on feedbacks and data reflected in Table 1, the major constraint in its wide-scale adoption is the cost of constructing the digester. An ordinary household cannot just accommodate the idea of having a unit simply because of high construction cost as the digester is made up of concrete and the materials and labor are expensive. In the present initiative, it ranged from P8,000.00 to P100,000.00 depending on the capacity of the digester. If there is a way of helping interested households or enterprises in investing in the technology, certainly the number of units would increase in the province of Marinduque.

One suggestion resulting from this study is for the local governments (municipal and/or provincial) to provide assistance, similar to the then program of the Development Bank of the Philippines as revealed by Alicbusan (1985). A local policy or ordinance on soft loan from the local government will certainly be helpful in the construction cost. That is, a non-collateral and interest-free loan could be formulated wherein the amortization should be approximated based on the expenditures of the household on LPG fuel. This would enable family households to contain the cost as they would not feel the impact of the amount for construction because that would spread the cost over time and also that would just substitute their current expenditure on LPG which is approximately one tank per month. In fact, if their expenditure on LPG is equivalent of the monthly amortization, there would be no impact at all on the family coffers.

Another problem could be the immediate source of waste or manure for feeding the digester. The present biogas technology being commercialized by DOST is to use pig manure or cow/carabao dung but not all households are raising any or all of these animal types in their backyard. Other waste materials which are commonly found in rural areas or agricultural farms like chicken dung, water lily, dried banana leaves, ipil-ipil and other farm wastes (Alucbusan, 1985; Anglo, Silverio & Luis, 1986) may be used but these are not covered in the present DOST program.

Corollarilly, potential households and enterprises shall be chosen and priority should be given to those who have both the financial capability for the construction of digesters, and ready source of waste materials like manures for the digester. The second priority should be enterprises depending on electricity and/or liquefied petroleum gas (LPG) to generate energy to produce their products or services.

The rate of adopting the technology in the province is approximately one unit per year and this could definitely increase if there is an intensified and regular awareness campaign on the technology. The present system of technology introduction and commercialization at DOST-Marinduque is that there is only one technical staff attending to various technology commercialization programs aside from attending to routinary activities of the office.

In view of these experiences and to enhance technology adoption, a technology manager who would focus on promoting biogas is imperative and his/her function should include among others to serve as a biogas technology promotion "walking media", on-call resource person, and technical support coordinator. This may come from the R & D workers in the province who have the experience in technology promotion and equipped with the technical and socio-economic understanding of the biogas system.

While the study covered only a limited number of only 7 cases, a sign which is indicative of multiplier effect or technology diffusion may be drawn from 2 early adoptors of the technology. For instance, these 2 adoptors acted as anchors of technological information. They had naturally performed dissemination of the technology to another 3 who later eventually adopted the system. Dissemination of technology does not happen spontaneously but rather inducing it requires sustained effort, careful planning, and commitment to the advancement and promotion of the technology (Cuyno, undated). This strengthens the imperativeness of having a technology manager in the province.

The campaign for promoting the biogas technology needs to continue and the findings of around one unit per year necessitates intensified efforts and resources to increase the number of adoptors. This should be with a focused initiative, and this could be done though a technology manager. In addition, DOST taps or should be able to influence local governments to support this initiative if it wants to make a significant impact in the technology commercialization of biogas.

A model for using biogas for lighting purposes should also be put up to demonstrate a different use albeit other uses which have been found viable.

Investment Analysis for the Technology Promotion Initiative. In the promotion of the biogas technology, DOST-Marinduque had chosen an avenue for dissemination with great potential impact and that is, the school system and for this particular technology, the Marinduque State College. One should note that the technology on biogas has been there dating back in the olden days. However, its utilization is still limited or not on a wide-scale extent because of some problems and one of which is the high cost of constructing the digester.

According to the DOST-Marinduque technical staff, if he has to impute values on all his activities in promoting the technology like facilitating DOST-Rizal to provide technical supervision during the construction of the first biogas system, the training that they attended in DOST-Rizal, coordination cost, time and effort, it would just amount to only less than P10,000 and this is for the initial biogas system in MSC-SA. The promotion related cost for the rest of the adoptors were already very minimal considering that the DOST-Rizal supervised only the construction of the first digester and there was no training cost incurred anymore. Succeeding promotional activities were mostly done by Mr. Simon whenever he attends to the hog raisers.

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CONCLUSION

THE STUDY WAS CONDUCTED TO APPRAISE THE BIOGAS TECHNOLOGY COMMERCIALIZATION INITIATIVE IN MARINDUQUE. THE RESULTS COULD ENRICH THE ONGOING TECHNOLOGY PROMOTION AND COMMERCIALIZATION STRATEGY. IT COULD BE NOTED IN THE FINDINGS THAT IF BIOGAS TECHNOLOGY IS TO BE POPULARIZED IN THE PROVINCE OR EVEN IN OTHER PROVINCES OF THE COUNTRY, THERE IS A NEED TO INTENSIFY THE CAMPAIGN WITH COMPREHENSIVELY COMPLETE INFORMATION IN TERMS OF CONSTRUCTION AND UTILIZATION. THAT THERE IS ALSO A NEED TO STRATIFY WOULD BE USERS AND PRIORITIZE THOSE WITH FINANCIAL CAPACITY AND DIGESTER RAW MATERIAL AVAILABILITY, AND THOSE BUSINESS/LIVELIHOOD ENTERPRISES WHOSE POTENTIAL FOR THE VIABILITY FOR "BIOGASINATION" IS IMPERATIVE TO REDUCE COST OF THEIR OPERATIONS AND HOUSEHOLDS NEEDING FINANCIAL ASSISTANCE. LASTLY, THERE IS A NEED TO HAVE A BIOGAS TECHNOLOGY MANAGER NOT ONLY TO ASSIST DOST-MARINDUQUE BUT ALSO TO MAKE THE PROGRAM VISIBLE AND TO CHAMPION THE BIOGAS TECHNOLOGY.

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STATE OF KNOWLEDGE IN GROWING AND USING SELECTED DIOSCOREA SPECIES IN MARINDUQUE

CARLOS J. ANDAM & EMMA M. CABILDO

INTRODUCTION

Indigenous rootcrops such as those belonging to the Dioscorea family are valued greatly as food sources especially for people in the rural areas and mountain hinterlands. Aside from the common ubi (*Dioscorea alata*), tugui (*D. esculenta*), *ulabi* (*D. luzonensis*), and *lima-lima* (*D. pentaphylla*) are relished as plain boiled tubers for breakfast or snacks and ingredients for many dishes/recipies and snacks. Inspite of these varied uses since time immemorial, only limited studies in their production, processing and utilization have been undertaken. If ever, these studies done elsewhere in the country are not widely disseminated and there is no indication that technical information has diffused in Marinduque. Lately, however, three studies were reported in this island province because of their potential for developing their many uses.

The intent of this paper therefore is to review available researches done in Marinduque and identify technologies that could intensify use of the roots or processing of the roots. This synthesis would likewise provide an indication of the gaps and direction of future R & D works in the province.

REVIEW OF LITERATURE

Botanical Description

The yam family (*Dioscoreaceae*) is monocotyledonous and is a twining plant and have heart shape leaves arranged alternately and stratified thorns along the stem. The stem is not so strong so it needs to have something strong wherein the vine can coil around up. There are many species in the family and each has many varieties (Quisumbing, 1978) like the following: *Dioscorea penthaphylla* L. (*lima-lima*), *D. esculenta* (Lour) Burkill (*tugui* or *tugi*), *D. divaricata* Blanco (*burot*), *D. luzonensis* Schaver (*ulabi or pakit*), and *D. hispida Dennst* (*nami*).

Recent reports disclosed that there are four different types of Tugui commonly grown in the Philippines such as potato type, spiny type, long type, and hand like type.

The Tubers

The yam varies widely in taste and in appearance. Yams' flesh ranges in color from white to yellow, pink or purple. They vary also in taste from sweet to bitter to tasteless. Yams are consumed as cooked starchy vegetables. They are often boiled and then masked into a sticky paste or dough, but they may also be fried, roasted, or bake in the manner of potatoes (Bayer et al., 2003).

It has a thin brown skin that gives them a distinct characteristic from other root crops. Tubers differ in size, some are medium, small and there are big and sold at different prices. There are different types of tugui such as spiny type, hand like type, potato type and long type. It is a climbing vine,. In addition, tubers are not deep rooted. The tubers are used as ingredient or flavoring of special delicacies and ice cream making (Giron, 1994). Moreover, they can be used in processing a variety of appetizers, which is made up of tugui such as pastillas, jam, boiled with salt and combination of coco milk known as "ginataan" although others used for animal feeds and as medicine to cure diseases.

During rice shortages, tugui serves as alternative food for people in some barangay of Gasan namely; Tiguion, Tabionan, and Matandang Gasan. It is also becoming an important cash crop as one of the sources of income and supplement to rice (Lacaden, 1993).

Like other root crops, tugui tubers have also strong aroma and contains small amount of sugars (Onwueme, 1981) rich in starch and are a fair source of Vitamin B (Asuncion, 1977). It is excellent sources of carbohydrates and about 2-3 tubers are enough to fill the stomach for several hours specially when served with a cup of coffee during breakfast.

Tugui has its excellent taste/chewing characteristic especially when it is newly cooked, tastier because sugars are present in fresh yam tubers in small quantity (Onwueme, 1981).

Several studies were done on yams, which include varietals collection, yield evaluation, cultural management, postproduction, and some on the nutritional compositions and starch properties. But studies on the knowledge of village users point of view are still lacking (Salazar, 1994).

METHODOLOGY

ndigenous Knowledge

Data on indigenous knowledge on tugui particularly on its farming practices, food uses and preparations, and the medicinal uses o preparations were adapted from the survey made by Maranan and Sager (2007). Their result were supplemented with interviews with eople who are known to have knowledge and experience on tugui growing and their uses in Marinduque.

ber Processing

Data on food processing of the tubers were adapted from the works of Lacdao and Mendiola (2006) on chips, Domingo and Eden 006) on fries, and Jalimbawa (2006) on pastilles. On chips from *lima-lima* tubers, the data were adapted from Remoroza (2006). All hese authors used the Hedonic scale in evaluating the acceptability of the processed products.

Medicinal Uses and Preparations

Aside from the work of Maranan and Sager (2007) in Marinduque, some foreign and local literatures were consulted for the me- ional properties of tugui. To capture local medicinal uses, some interviews were done with knowledgeable local folks.

RESULTS AND DISCUSSION

ndigenous Food Uses

There are seven food preparations or recipes reported by more than 30% among 40 respondents wherein tugui is used in the rovince but the most common is by boiling the tubers similar to sweet potatoes. The practice is to boils just enough for the household reakfast and afternoon snacks. Another preparation is using the tubers as one of the ingredients in the preparation of *ginataan*, a snack ecipe cooked with coconut milk, or in two popular viands locally known as *sinigang* and *menudo*. The later practice is commonly prepared barangay Antipolo especially during fiestas when potatoes are not available in the market.

Boiled and chopped tubers is also mixed in the popular afternoon snacks, *halo-halo*. Pastilles or *pastilles* in the local dialect may so be prepared out of the tubers. In fact, it has been validated by the work of Jalimawa (2006). Similar to pastilles, *haleya*, another local reparation is a common use of the tubers. Aa characteristic of tugui is its strong aroma which makes it good for making pastilles, *haleya* nd as flavoring ingredient of *halo-halo*.

ndigenous Medicinal Uses

Five ailments were identified from among 40 respondents in barangay Antipolo in Gasan, Marinduque. About one-half of them ally believed on the effectiveness that when the sticky liquid of the tuber is wiped on near the sides of the forehead can cure the common eadache. They said that it absorbs the pain. To use it, just simply peel the tubers and rub or wipe on the flesh of the tuber into the sides f the forehead or where the pain is felt. Some people who indicated that the sticky liquid could cure boils, wounds and swelling when ap- ied in a similar manner.

Still, a number of people believed that eating tugui heals rheumatism. Some 20% said that it will detoxify and eliminate fats and ric acid in the body.

hips Preparations and Quality

The study of Lacdao and Mendiola (2006) processed the tugui tubers into chips. With three different ways of preparing the chips efore deep frying such as frying immediately the freshly cut chips, and sun-drying or air-drying the fresh chips prior to deep frying. The esult from organoleptic test from a panel of 15 tasters indicated no significant differences among these three treatments in terms of the exture, appearance, color and taste of the fried chips (Table 1). The quality therefore is comparable regardless on how the tubers are pre- ared before cooking.

Table 1. Quality evaluation of tugui chips (Lacdao and Mendiola, 2006).

Treatments	Texture	Appearance	Color	Taste
Fresh Chips	3.83a	3.66a	3.50a	3.10a
Sun-dried Chips	3.60a	3.80a	3.70a	3.20a
Air-dried Chips	3.63a	3.66a	3.56a	3.20a

No significant difference by ANOVA at 5% level

In *lima-lima* tubers, the results of the study of Remoroza (2006) are shown in Table 2. Cooking freshly cut chips had better quality in all four quality parameters which are significantly different among the three treatments. Freshly cut tubers into chips when fried immediately were tasted by a panel of 15 tasters to have superior quality than sun-drying for one-half day prior to frying. Quality further decreased when the freshly cut chips are sun-dried for a whole day.

Table 2. Quality evaluation of *lima-lima* chips (Remoroza, 2006).

Treatments	Color	Texture	Appearance	Palatability
Fresh Chips	5.0	5.0	4.5	5.0
½ Sun-dried	4.26	4.13	4.13	3.2
Whole-day	2.6	3.53	3.67	2.07

Two other species of *Dioscorea* were tried for chips making by Domingo and Eden (2006) and the results are shown in Table 3. Apparently, quality evaluation results are similar in terms of texture, color, taste and appearance. Although color seem to be more attractive in *ulabi* than *ubi*. Probably, this is because of the dark color of *ubi* compared to the cream colored *ulabi*.

Table 3. Quality evaluation of chips from *ubi* and *ulabi* (Domingo and Eden, 2006).

Criteria	Ubi *(D. alata)*	*Ulabi (D. luzonensis)*
Texture	1.97	1.99
Color	1.74	2.08
Taste	1.96	2.03
Appearance	1.76	1.88
Average	1.86	1.99

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Pastilles Preparation and Quality

Different ways of flavoring pastilles from tugui were tried by Jalimbawa (2006). In general, quality indicators such as color, texture, aroma and appearance are comparable among the different flavoring treatments with the unflavored control. Palatability, however, was affected by the flavoring treatments. Lower quality was observed in the control treatment.

Table 4. Quality evaluation of pastilles from tugui (Jalimbawa, 2006).

Treatments	Color	Texture	Aroma	Appearance	Palatability
Pandan	3.9a	3.9a	3.7a	4.2a	3.9a
Unflavored	4.4a	3.6a	4.1a	4.1a	4.1bc
Milk + food coloring	4.6a	3.9a	4.2a	3.9a	4.4abc
Milk	4.2a	4.4a	4.6a	4.6a	4.7ab
Cheese	3.8a	3.7a	4.0a	3.7a	4.8a
Cheese + Milk	4.1a	4.1a	4.6a	4.4a	4.8a

Different suffix letters indicate significant differences among treatments by ANOVA at 5% level.

SUMMARY AND RECOMMENDATIONS

Four studies on root crops processing, *tugui (D. esculenta)* and *lima-lima (D. pentaphylla)*, were done in the province of Marinduque. These studies dealt mainly on indigenous practices and uses, and processing of cracker chips and pastilles. There were many indigenous uses in food preparation ranging from snack items to viands to medicinal uses to cure five different ailments.

The other sets of studies focused on processing of cracker chips and pastilles. The results basing on quality evaluation alone indicated the potential of tugui and lima-lima for validating the results with more samples, other treatments and larger number of taste testers. While nutrient analysis is recognized in all the studies on processing, it was not done so because of the limitations of laboratory services in the province. This suggested, however, in future studies including shelf-life of the products.

These two rootcrops if developed and commercialized, would certainly benefit farmers in the uplands and hinterlands where tugui and *lima-lima* are grown as supply raw materials is necessarily imperative in a commercial processing venture. In like manner, agronomic studies should be conducted to compliment the development of processing technologies.

Phytochemical screenning to identify the active constituents that may have bearing on the medicinal claims of rural folks are likewise a challenge to researchers.

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SAS Extension Program Proposals: Environmental Simulation Mobile Theater, (ESMT), English Enhancement Extension Program and Brgy. Newsletter Writing Workshop (BN2W) - RANDY T. NOBLEZA

Environmental simulation mobile Theater (ESMT)

ince the inception of the School of Arts and ciences on 1995, the Marinduque State ollege conceptualized 4 programs: namely B Communication Arts, AB English, BS Enepreneurship and BS Law Enforcement dministration. AB Communication Arts has eady produced competent graduates along ith AB English and BS Entrepreneurship. But arting this semester (2nd semester 2011-2), School of Arts and Sciences would only composed of AB Communication and AB nglish since the organization of two new SC units, School of Business Management BM) and School of Criminal Justice Educa-n (SCJE). In consonance with the Research d Extension Thrusts of the College, the hool of Arts and Sciences would be extend-its services and expertise to the communi-s of Boac and Mogpog initially thru the vironmental Simulation Mobile Theater MT) composed of AB Communication stu-nts, SAS faculty members and people from communities.

s is part of the humanities subject, hum 3 (popular culture), humanities (world civi-tions and literature), hum 121 (arts appre-ion), hum 311 (art studies) and hum 123 o to humanities). Usually towards the end very semester, instead of having final and term examinations, a couple of culminat-activities are organized. The Simulations vity is a dry run of the performance of the dents of both AB English and AB Commu-tions. After which, a final group perform-e would run after comments and sugges-s were given during the simulations activ-

e the 1997 moratorium on large scale ng, after the mine tailings spillage from Marcopper Mining Corporation, Marindu-has been in the forefront of all similar ements in the country. Raising concerns he environment. Although in the last 10 s, there had been shifts and changes, the closure of the Marcopper, from be-lisaster prone to being disaster ready conscious. The School of Arts and Sci-s, within its reasonable limits is engaged areness building and consciousness g on climate change and other environ-tal concerns.

, Ino, Brgy. Capayang, Brgy. Janagdong, Cibucao

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nicipality of Mogpog

Brgy. Newsletter Writing Workshop (BN2W)

There two particular writing workshops that are continuously run every semester, during the 1st semester as part of the elective 311 (editorial and feature writing) and during the 2nd semester as part of the english 327 (creative writing) course. During the first workshop run, the output would get published in the school publication, Network Nexus. And during the second semester, the output would get published in a literary folio also of the said school.

Given the SAS vision and mission, CC2W is engaged in the grassroots and communities. The School of Arts and Sciences firmly believes that Marinduque is a social laboratory. Learning is not limited inside the four walls of the classroom. Marinduque, being blesses with cultural heritage, needs constant reinvigoration and development. Given the reality of globalization and climate change, the social and cultural dimension of Marinduque is confronting a constant threat. Therefore there is a need for cultural development and environmental awareness thru pedagogical potentials of a mobile theater. In addition to trainings and seminars on environmental concerns, CC2W could produce learning materials for the educational and cultural needs of the communities.

- 100 beneficiaries/ 11 communities
- 5 months training
- Municipality of Boac

English Language Enhancement Extension

SAS already offers English Language Enhancement Program (ELEP) for teachers and non teachers alike. It is also for professionals and high school graduates as a preparation for their college education. This is also based on the assumption that language teachers are not only those who teach about language, even other teachers who teach other course contents (math, science, social sciences, etc) are also language teachers. For all teachers and educators to be more effective and efficient, everyone should undergo the language enhancement.

There has been awareness and concern about the so-called "deterioration" of the English Language proficiency of the students, teachers and other professionals that has come up into focus in recent years because of the increasing demand for English-based jobs. Any institution that uses English language for official communication has to upgrade the competence of its personnel in English to improve the communication flow, information processing and decision-making in their own discipline or field of work.

The School of Arts & Sciences (SAS) in support to the above mentioned rationale has conceptualized this language enhancement program to be a part of its extension projects and be of service to the following clienteles:

1. MSC Faculty (especially those who are not in line with language)
2. Dep Ed Grade 1 Teachers
3. Incoming Student-Teachers of the School of Secondary Teacher Education

Incoming third year (AB English and AB Communication Arts) students.

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mier College in the Region along the fields of Instruction, Research, and Production

quality, responsive and dynamic leadership in the areas of Education, Technology, neering, Environment, Agriculture, Fisheries, Culture, Arts and Sciences to empower earing individuals who are innovators and protectors for the sustainable develop-of the province and the country as a whole.

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VISION

MSC - a premier College in the Region along the fields of Instruction, Research, Extension and Production.

MISSION

Provide quality, responsive and dynamic leadership in the areas of Education, Technology, Engineering, Environment, Agriculture, Fisheries, Culture, Arts and Sciences to empower God-fearing individuals who are innovators and protectors for the sustainable development of the province and the country as a whole.

SCHOOL OF ARTS AND SCIENCES GOALS AND OBJECTIVES

To produce competent graduates in the fields of Arts and Sciences responsive to social needs and committed to serve and global communities.

BUILD A BRIGHTER FUTURE WITH MSC!

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